



Department  
for Environment  
Food & Rural Affairs

# Atlantic Bluefin Tuna Catch and Release Tagging programme (CHART) 2022

## Project Review Report

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This review has been quality assured by Cefas science and Defra analytical teams but has not undergone external peer review

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# Executive Summary

The CHART 2022 programme featured recreational charter vessels fishing in SW English waters as part of a scientific study to understand the distribution, abundance, and behaviour of Atlantic bluefin tuna. In total, 25 vessels tagged 1,090 fish during a total of 631 fishing day-trips. Minimal impacts to fish welfare, amounting to five fish mortalities, were reported. Based on responses from participating anglers, spending from anglers induced a direct economic impact of approximately £1.3million, which can be translated into an induced total economic impact of £2.6 million, providing £733k of Gross Value Added (GVA) and supporting approximately 34 full-time employment (FTE) positions within the local economy. Most of the angler spend (91%) took place within the South-West of England. The expenditure and investments of the skippers contributed to a further induced economic impact of £846k, GVA of £216k and supported 9 FTEs in addition to the 14 FTEs employed specifically for CHART 2022. About 44% of the skippers' spending was retained locally.

# Introduction

Following an increase in sightings and encounters of Atlantic bluefin tuna (*Thunnus thynnus*- hereafter BFT) in English waters, interest from governmental, scientific, and particularly recreational fisheries stakeholders resulted in the proposal, collaborative design, and implementation of a Catch and Release Tag fishery (CHART) in 2021. The project was operationally delivered by the Centre for Environment, Fisheries and Aquaculture Science (CEFAS), with project oversight by a project Steering Group (SG) consisting of a variety of governmental and recreational fisheries stakeholders<sup>1</sup>. CHART 2021 ran for a 13-week season and involved 15 vessels selected through an open application process. Overall, 704 BFT were tagged with Floy identification tags from a total of 421 fishing trips. A further 19 BFT were tagged with electronic satellite tags. The project was reviewed in early 2022, and considered an operational and scientific success ([Defra, 2022](#)) particularly given the quality and range of data collected, and the minimal impact to fish welfare. CHART 2021 also delivered a range of social and economic benefits, with a total economic impact from CHART anglers of £742k, providing £157k of Gross Value Added (GVA) and supporting approximately 9 FTEs. Building on the success of CHART 2021, a follow-on and expanded programme, CHART 2022, was commissioned by Defra.

The design of CHART 2022 followed that of 2021, with a Steering Group maintaining oversight and continuing to refine and evolve the programme as fleet size increased from 15 to 25 vessels and season length was extended from 13 to 17 weeks. It should be noted that the project Steering Group met on a regular basis, albeit less frequently than for CHART 2021 because much of the co-design and preparatory work was already in place from the previous year's programme. Since the programme was expanding, an application process was opened to enable the charter fishing community to express their interest in participation. Criteria were set to select the 25 vessels and skippers that would be granted a licence, and participation was conditional, once again, on participation in in-person training. This training was tiered: new entrants were required to attend a two-day training course that was co-delivered with stakeholders, while returning participants were required only to attend the first day of the training course to refresh the training they had received the previous year. The training considered refinements identified in the evaluation of CHART 2021, including the top priority to collect data digitally rather than on paper forms. To achieve this, all the data collection was moved to the Qualtrics platform ([www.qualtrics.com](http://www.qualtrics.com)) which enables users to input data using mobile phones or tablets, and for data to be submitted through the mobile data network or over Wi-Fi. The forms used pre-defined options, sliders and free-text input to collect data on fishing trips, captured BFT, and sightings of BFT and other notable wildlife. This improvement made it easier for skippers to enter data in a controlled way, and for Cefas to validate the data using computer code. A second significant refinement was the use of tough tablet camera systems on the vessels new to the programme, and the requirement for returning vessels to carry GPS trackers.

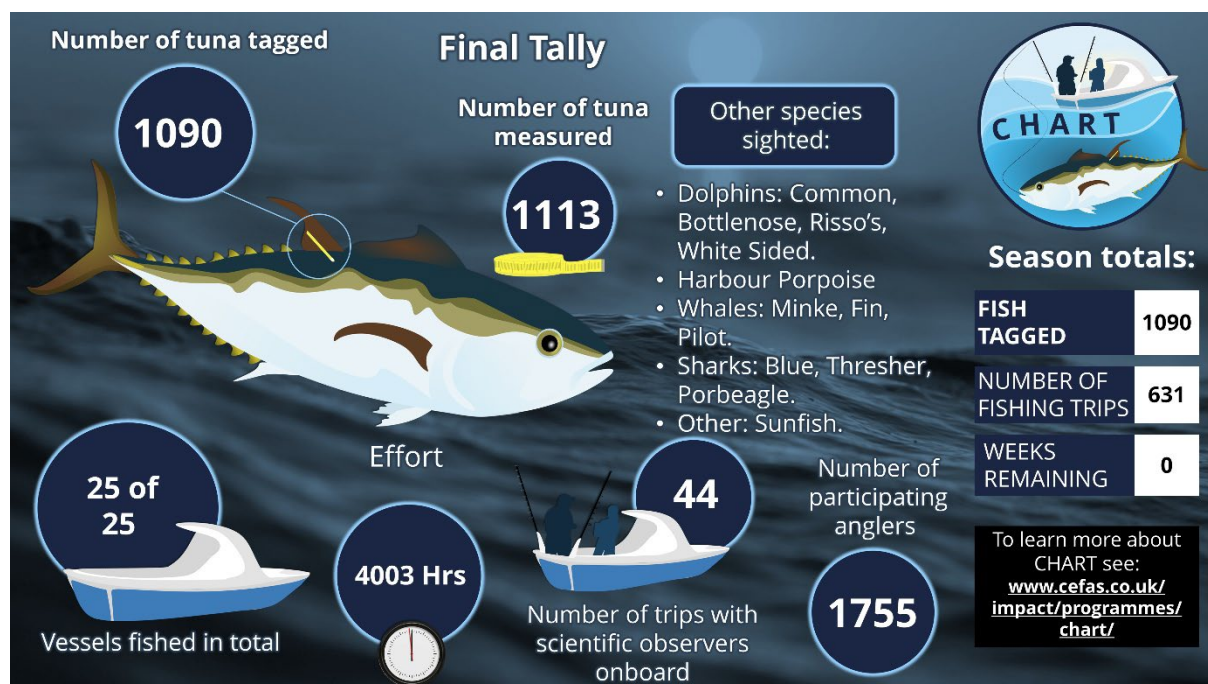
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<sup>1</sup> The project Steering Group consisted of officials from Defra, the MMO, Natural England, Cornwall IFCA, as well as key recreational sea angling stakeholders from the Angling Trust and Bluefin Tuna UK.

This review document presents an overview of the operational performance of CHART 2022, as well as highlighting key metrics on the social and economic impact of the project.

## Part 1: Operational Review

The CHART 2022 programme ran from the 15<sup>th</sup> August to the 11<sup>th</sup> December inclusive with the participation of 25 vessels. A total of 631 fishing trips took place (over 4,000 hours of fishing effort), with nearly 1,800 paying anglers taking part. In total, 1,273 BFT were hooked for more than 30 seconds (i.e. for long enough that the hook was likely positioned well), of which 1,090 (86%) were brought boatside for measuring and tagging (a Catch per Unit Effort (CPUE) of 1.76 BFT per day's fishing). The number of fish caught per day was highest in week ten (17<sup>th</sup> to 23<sup>rd</sup> October) with a CPUE of approximately four fish per vessel per fishing day but, unlike 2021, a series of south westerly gales during November prevented fishing for much of the month and reduced the CPUE thereafter. Weekly statistics on catch rates were published on the Cefas website and on social media (example shown in Figure 1).



**Figure 1. Example infographic available on the Cefas CHART 2022 website.**

Of the 1,120 fish brought boatside, the average time from hooking to restraint ('fight time') was 23 minutes with over 75% of fish being alongside within 30 minutes. 92% of these BFT were hooked in the scissors, 6.5% were hooked in the jaw but not the scissors, 1.25% were hooked in the cheek, 0.7% were foul hooked outside of the jaw and 0.3% were deep hooked. A small proportion of hooked fish (31, or 2.5%) were lost with retained gear (hook or spreader bar). The average post-tagging recovery time, during which BFT were towed alongside or behind the vessel to assist ventilation, was 6.6 minutes. Following this process, the number of BFT classified as lethargic dropped from 1% (pre-tagging) to 0.5%, highlighting the effectiveness of the recovery

procedure. There were five mortality events in CHART 2022 (0.4% of BFT caught), compared to ten in CHART 2021 (1.4%). Overall, the welfare outcomes in CHART 2022 were further improved compared to the high standards already achieved in CHART 2021, despite the higher catch rates and wider involvement in the programme.

## **Part 2: Social and Economic Evaluation**

Alongside the evaluation of the operational aspects of CHART 2021, it is essential to understand the wider social and economic impact of the project to inform on the benefits delivered to both skippers and local coastal communities, but also to understand how further development of the project and potential future BFT fisheries may bring additional social and economic gains to those involved as well as to local and national economies. Therefore, two separate surveys were undertaken by Cefas. One survey focused on the motivation and spend of anglers to participate in CHART and the economic impact generated by the angler spend. A second survey was undertaken to understand the motivation of skippers to participate in the programme, the economic viability of the programme, as well as the economic impact of the spend of skippers.

### **Design and methodology**

Surveys designed for CHART 2021, eliciting information from anglers and skippers on their motivation and spending to take part in CHART, were updated to fit the purpose of CHART 2022 and implemented online using the online survey provider Qualtrics ([www.qualtrics.com](http://www.qualtrics.com)). The skippers were asked to distribute the angler survey among their anglers by providing them with a link and QR code to the survey. The economic impact of the spending undertaken by anglers and skippers to participate in CHART were assessed with help of an Input-Output analysis. To integrate the investment of the skippers into the analysis, a depreciation approach was used. Based on the information provided by the skippers, the economic viability of the programme was assessed as well.

## **Results**

### **Angler survey**

CHART 2022 took 1,755 anglers on 622 bluefin tuna fishing trips. About 5% of the anglers responded to our survey. Based on their responses, a small percentage were locals, but the majority of the anglers (96%) took it up on themselves to travel on average 256km and spent on average 3.1 days in the area specifically to take part in CHART 2022, motivated by the opportunity to catch a large tuna (>300lb) and gain a new experience. Most of these anglers were over 45 years old and had above average household income. This led to rather high average trip spending to take part in CHART compared to the average spending reported by other sea anglers in the UK. Information on the angler spend allowed us to estimate the local, national and general economic impact induced by CHART 2022. Induced solely by the spend of the anglers to participate in CHART, a total economic impact of £2.6 million and a GVA of £733k was calculated. The spend of the anglers supported the employment



of 34 FTEs in 2022. About 91% of the angler spend took place in the South-West of England, hence most of the economic impact was retained locally.

### **Skipper survey**

In 2022, 25 skippers took part in CHART of which 11 skippers responded to our skipper survey. Their responses indicated that most skippers who took part in CHART 2022 offered sea angling trips or wildlife watching trips before participating in CHART. Half of the skippers moved their boats in 2022 into the area (on average 138 miles) to take part in CHART, while five of the skippers were already part of CHART 2021. Skippers were motivated to take part in CHART to increase their business resilience and viability but also to engage with scientists and develop professionally. However, at the end of the season, skippers reported to have experienced more often personal development than an increase in business resilience and viability.

It was estimated that CHART provided skippers with an operating profitability of 32% (estimated total operating profit as percentage of total revenues generated by chart). While the programme extended from 15 in 2021 to 25 skippers in 2022 (+66%), skippers increased their expenditure and investment into CHART on average about 58%. However, due to the long-term investment, it was estimated that the value of the equipment used in CHART increased to about 171% of the 2021 level. Biggest changes in expenditure are unsurprisingly driven by increase in mooring fees due to relocation of their business for the season. It was estimated that CHART induced a total economic impact of £846k, a GVA of £216k and supported in total 9 FTEs in addition to the 14 FTEs employed as crew specifically for CHART. About 44% of the economic impact generated by skippers taking part in CHART was retained locally.

## Conclusions

The extension of the programme from 15 skippers in 2021 to 25 skippers in 2022, allowed skippers to increase the number of anglers from 1,061 on 419 trips in 2021 to 1,792 anglers (+69%) on 631 trips (+51%), and to measure and tag more bluefin tuna (1090, +55%). The programme will further aid the understanding of BFT within English waters and provides strong evidence of the suitability to bluefin tuna of the area to the south-west of the UK.

Aside from extending the time-series of the fishery data, the response from the angler and skipper surveys provides an understanding of the economic benefits of the fishery. The data suggest that the programme attracted more anglers into the region who would not have visited otherwise, and that they were drawn from a wealthier population segment than in CHART 2021, leading to a greater spend per trip. Furthermore, participants stayed longer in the local area than in CHART 2021. As such, the economic impact was calculated to be 3.5 times higher in 2022 than in 2021. Most of the economic impact generated by anglers' spend was retained locally.

In contrast, the operational profitability for skippers to take part in CHART decreased from 46% to 32%. Although skippers increased their charter fees and therewith their revenues, the average variable trip cost for skippers to offer CHART also increased significantly. At the same time, skippers invested significantly more into the CHART programme through equipment purchases than they did in 2021..

# Glossary

**Depreciation approach:** Depreciation allows businesses to spread the cost of physical assets (such as a piece of machinery or a fleet of cars) over a period of years for accounting and tax purposes. There are several different depreciation methods, including straight-line and various forms of accelerated depreciation. [[Depreciation: Definition and Types, With Calculation Examples \(investopedia.com\)](#)]. In this study, following the GAAP guidelines for depreciation of boat were used as outlined here: [[How to calculate marginal return on an investment \(ehow.co.uk\)](#)] [last accessed: 24/01/2024]

**Floy tag:** a long, narrow plastic tag with a unique identification number printed on it.

**Gross Value Added:** GVA provides a dollar value for the amount of goods and services that have been produced in a country, minus the cost of all inputs and raw materials that are directly attributable to that production. GVA thus adjusts gross domestic product (GDP) by the impact of subsidies and taxes (tariffs) on products. [[Gross Value Added \(GVA\): Explanation, Formula, Example \(investopedia.com\)](#)]; 24/01/2024]

**Input-Output analysis:** Input-output analysis (I-O) is a form of macroeconomic analysis based on the interdependencies between different economic sectors or industries. This method is commonly used for estimating the impacts of positive or negative economic shocks and analysing the ripple effects throughout an economy. I-O economic analysis was originally developed by Wassily Leontief (1906–1999), who later won the Nobel Memorial Prize in Economic Sciences for his work in this area [[Input-Output Analysis: Definition, Main Features, and Types \(investopedia.com\)](#)]; 24/01/2024]

**Spreader bar:** a type of fishing gear that is used to tow multiple fishing lures, which are attractive to fish that feed on prey that occur in groups. The lures are arranged in a row along the bar, with one of the lures containing a hook.

**Tough tablet:** a tablet style computer system that can withstand harsh conditions and use, such as exposure to the elements, including rain and salt-spray.